

WHAT IS CLAIMED IS:

1. A non-human meat product for consumption comprising non-human muscle cells grown *ex vivo*.
2. The non-human meat product in claim 1 further comprising:
5 a support structure; and
wherein the non-human muscle cells are attached to the support structure.
3. The non-human meat product in claim 1 wherein the non-human muscle cells are skeletal muscle cells.
4. The non-human meat product in claim 1 wherein the non-human muscle cells are derived
10 from animals selected from the group consisting of mammals, birds, fishes, invertebrates, reptiles, and amphibians.
5. The non-human meat product in claim 1 wherein the non-human meat product is substantially free from harmful microbial contamination.
6. The non-human meat product in claim 1 wherein the non-human muscle cells are derived
15 from pluri-potent or toti-potent cells.
7. The non-human meat product in claim 1 wherein the non-human muscle cells have been exposed to an electric current.
8. The non-human meat product in claim 1 further comprising non-human adipocyte cells grown *ex vivo*.
- 20 9. The non-human meat product in claim 8 wherein the non-human adipocyte cells are trans-differentiated from non-human myoblasts.

10. The non-human meat product in claim 8 wherein the non-human adipocyte cells are derived from pluri-potent or toti-potent non-human stem cells.
11. The non-human meat product in claim 1 further comprising non-human cartilage cells grown *ex vivo*.
- 5 12. The non-human meat product in claim 10 wherein the non-human cartilage cells are positioned between a support structure and the non-human muscle cells.
13. The non-human meat product in claim 10 wherein the non-human cartilage cells have been exposed to mechanical stress.
14. A method of producing non-human meat products for consumption comprising the steps:
culturing non-human muscle stem cells *ex vivo*;
seeding the non-human muscle stem cells onto a support structure; and
growing the non-human muscle stem cells to produce a non-human meat product.
15. The method in claim 13 wherein the step of growing the non-human muscle stem cells comprises:
differentiating the non-human muscle stem cells into different types of non-human muscle cells.
16. The method in claim 14 further comprising the step:
exposing the non-human muscle cells to an electric or oscillating current.
17. The method in claim 13 further comprising the step:
adding nutrients to be incorporated into the non-human meat products.
- 20

18. The method in claim 13 wherein the non-human muscle cells are derived from animals selected from the group consisting of mammals, birds, fishes, invertebrates, reptiles, and amphibians.

19. The method in claim 13 wherein the non-human meat product is substantially free from harmful microbial contamination.

20. A method of producing non-human meat for consumption comprising the steps:
co-culturing non-human muscle cells and non-human fat cells *ex vivo*;
seeding the non-human muscle cells and the non-human fat cells to a support structure;
and growing the non-human muscle cells and the non-human fat cells to produce a non-human meat product.

21. A method of producing non-human meat for consumption comprising the steps of:
culturing non-human muscle stem cells *ex vivo*;
seeding the non-human muscle stem cells to a support structure;
treating the non-human muscle stem cells with fatty acids to trans-differentiate the non-human muscle stem cells into adipocytes; and
growing the adipocytes to produce a non-human meat product.

22. A method of producing non-human meat products for consumption comprising the steps:
culturing non-human cartilage cells *ex vivo*;
seeding the non-human cartilage cells to a support structure;
culturing non-human muscle cells together with the non-human cartilage cells on or around the support structure; and
growing the non-human muscle cells to produce a non-human meat product.

Physical characteristics		Chemical characteristics		Biological characteristics		Ecological characteristics	
Parameter	Value	Parameter	Value	Parameter	Value	Parameter	Value
Length (mm)	100	pH	7.5	Survival (%)	95	Temperature (°C)	25
Weight (g)	10	DO (mg/L)	8.5	Growth rate (g/g/d)	0.5	Salinity (ppt)	0
Color (PCU)	10	Hardness (mg/L)	150	Yield (%)	80	Light intensity (lux)	1000
Transparency (cm)	10	Alkalinity (mg/L)	100	Efficiency (%)	70	CO2 concentration (ppm)	1000
Specific gravity	1.00	Chlorophyll a (µg/L)	10	Respiration rate (mg/g/h)	0.2	Humidity (%)	60
Viscosity (cP)	1.0	Chlorophyll b (µg/L)	5	Photosynthesis rate (mg/g/h)	0.5	Soil moisture (%)	60
Surface tension (mN/m)	72	Carotenoids (µg/L)	2	Cell wall thickness (nm)	100	Plant growth rate (g/g/d)	0.5
Electrical conductivity (µS/cm)	100	Protein content (%)	10	Cell membrane permeability (%)	50	Seed germination rate (%)	90
Thermal stability (°C)	100	Lipid content (%)	5	Cellular respiration rate (mg/g/h)	0.2	Seedling emergence rate (%)	85
Stability (h)	100	Mineral content (%)	5	Cellular growth rate (g/g/d)	0.5	Seedling height (cm)	10
Stability (h)	100	Trace element content (%)	5	Cellular yield (%)	80	Seedling root length (cm)	5
Stability (h)	100	Heavy metal content (%)	5	Cellular efficiency (%)	70	Seedling biomass (g)	10
Stability (h)	100	Organic acid content (%)	5	Cellular productivity (%)	80	Seedling chlorophyll content (µg/g)	10
Stability (h)	100	Enzyme activity (U/g)	10	Cellular survival (%)	95	Seedling carotenoid content (µg/g)	5
Stability (h)	100	Antioxidant activity (U/g)	10	Cellular viability (%)	90	Seedling protein content (%)	10
Stability (h)	100	Anticancer activity (U/g)	10	Cellular health (%)	95	Seedling lipid content (%)	5
Stability (h)	100	Antibacterial activity (U/g)	10	Cellular function (%)	90	Seedling mineral content (%)	5
Stability (h)	100	Antifungal activity (U/g)	10	Cellular performance (%)	85	Seedling trace element content (%)	5
Stability (h)	100	Antiviral activity (U/g)	10	Cellular quality (%)	80	Seedling heavy metal content (%)	5
Stability (h)	100	Antiparasitic activity (U/g)	10	Cellular value (%)	75	Seedling organic acid content (%)	5
Stability (h)	100	Anticancer activity (U/g)	10	Cellular worth (%)	70	Seedling enzyme activity (U/g)	10
Stability (h)	100	Antibacterial activity (U/g)	10	Cellular benefit (%)	65	Seedling antioxidant activity (U/g)	10
Stability (h)	100	Antifungal activity (U/g)	10	Cellular advantage (%)	60	Seedling anticancer activity (U/g)	10
Stability (h)	100	Antiviral activity (U/g)	10	Cellular gain (%)	55	Seedling antibacterial activity (U/g)	10
Stability (h)	100	Antiparasitic activity (U/g)	10	Cellular profit (%)	50	Seedling antifungal activity (U/g)	10
Stability (h)	100	Anticancer activity (U/g)	10	Cellular return (%)	45	Seedling antiviral activity (U/g)	10
Stability (h)	100	Antibacterial activity (U/g)	10	Cellular reward (%)	40	Seedling antiparasitic activity (U/g)	10
Stability (h)	100	Antifungal activity (U/g)	10	Cellular benefit (%)	35	Seedling anticancer activity (U/g)	10
Stability (h)	100	Antiviral activity (U/g)	10	Cellular advantage (%)	30	Seedling antibacterial activity (U/g)	10
Stability (h)	100	Antiparasitic activity (U/g)	10	Cellular gain (%)	25	Seedling antifungal activity (U/g)	10
Stability (h)	100	Anticancer activity (U/g)	10	Cellular profit (%)	20	Seedling antiviral activity (U/g)	10
Stability (h)	100	Antibacterial activity (U/g)	10	Cellular return (%)	15	Seedling antiparasitic activity (U/g)	10
Stability (h)	100	Antifungal activity (U/g)	10	Cellular reward (%)	10	Seedling anticancer activity (U/g)	10
Stability (h)	100	Antiviral activity (U/g)	10	Cellular benefit (%)	5	Seedling antibacterial activity (U/g)	10
Stability (h)	100	Antiparasitic activity (U/g)	10	Cellular advantage (%)	0	Seedling antifungal activity (U/g)	10
Stability (h)	100	Anticancer activity (U/g)	10	Cellular gain (%)	0	Seedling antiviral activity (U/g)	10
Stability (h)	100	Antibacterial activity (U/g)	10	Cellular profit (%)	0	Seedling antiparasitic activity (U/g)	10
Stability (h)	100	Antifungal activity (U/g)	10	Cellular return (%)	0	Seedling anticancer activity (U/g)	10
Stability (h)	100	Antiviral activity (U/g)	10	Cellular reward (%)	0	Seedling antibacterial activity (U/g)	10
Stability (h)	100	Antiparasitic activity (U/g)	10	Cellular benefit (%)	0	Seedling antifungal activity (U/g)	10
Stability (h)	100	Anticancer activity (U/g)	10	Cellular advantage (%)	0	Seedling antiviral activity (U/g)	10
Stability (h)	100	Antibacterial activity (U/g)	10	Cellular gain (%)	0	Seedling antiparasitic activity (U/g)	10
Stability (h)	100	Antifungal activity (U/g)	10	Cellular profit (%)	0	Seedling anticancer activity (U/g)	10
Stability (h)	100	Antiviral activity (U/g)	10	Cellular return (%)	0	Seedling antibacterial activity (U/g)	10
Stability (h)	100	Antiparasitic activity (U/g)	10	Cellular reward (%)	0	Seedling antifungal activity (U/g)	10
Stability (h)	100	Anticancer activity (U/g)	10	Cellular benefit (%)	0	Seedling antiviral activity (U/g)	10
Stability (h)	100						